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Signed J Evans.

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form).

24 SEP 1999

The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your Reference

P.6302.GBA

2. Patent application number
(The Patent Office will fill in this part)

9922511.2

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

New Transducers Limited
Ixworth House,
37 Ixworth Place,
LONDON SW3 3QH

Patents ADP number *(if you know it)*

7283676002 MB.

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

4. Title of the invention

Panel-Form Loudspeaker

5. Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

MAGUIRE BOSS
5 Crown Street
St. Ives
Cambridgeshire
PE17 4EB

Patents ADP number *(if you know it)*

07188725001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day/month/year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day/month/year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body:)
See note (d)

Yes

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	5
Claims(s)	
Abstract	
Drawing(s)	2 + 2

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature [signature] Date 23/09/99

MAGUIRE BOSS

12. Name and daytime telephone number of person to contact in the United Kingdom — Peter Maguire — Tel: 01480 301588

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Notes

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TITLE: PANEL-FORM LOUDSPEAKER

DESCRIPTION

The invention relates to loudspeakers and more particularly to resonant panel-form loudspeakers e.g. of the general kind described in International patent application WO97/09842. The technology described in this International application has come to be known as distributed mode or DM technology. A feature of resonant panel-form loudspeakers is that they may be made flat and of shallow depth and may thus be wall or ceiling mounted in a domestic, or other, environment to occupy a minimum of space. It has been suggested that the flat front face of the loudspeaker may be disguised as a picture or mural.

It is an object of the invention to take advantage of such wall or other surface mounting of panel-form loudspeakers for other purposes.

According to the invention, there is provided a panel-form loudspeaker comprising a resonant panel-form member having a front face and rear face, a vibration

exciter mounted to the member to excite bending-wave vibration in the member, and a light emitter mounted at or adjacent to the rear face of the panel and arranged to illuminate an area adjacent to the member.

The loudspeaker may comprise an enclosure defining a cavity enclosing at least a portion of the rear face of the member. The light-emitter may be disposed in the cavity and may be arranged to emit light through at least one window therein. The enclosure may be transparent or translucent to light. The enclosure may be moulded from a clear plastic such as polycarbonate. The enclosure may be formed with one or more lenses to direct the emitted light as desired. The lens(es) may be moulded integrally with the enclosure.

The enclosure is preferably acoustically opaque to prevent or reduce acoustic radiation from the rear face of the panel. The cavity may be dimensioned such as to modify the modal behaviour of the member.

The light emitter may comprise a fluorescent device, or other device which does not emit significant heat. Such a device may be a low voltage device. Power to the light emitter may be supplied via lead(s) powering the vibration exciter.

The loudspeaker may further comprise a front cover. The front cover will be acoustically transparent to allow acoustic radiation from the panel to pass through. The front cover is preferably opaque to light. The front cover may be arranged to extend beyond the panel

perimeter and the enclosure. The loudspeaker may be adapted to be wall or ceiling mounted. Thus, when so mounted, the front cover may at least partly conceal the loudspeaker enclosure from view.

The invention is diagrammatically illustrated, by way of example, in the accompanying drawings in which:

Figure 1 shows an exploded perspective view of a panel-form loudspeaker embodying the present invention;

Figure 2a is a plan view of a panel-form loudspeaker embodying the present invention and generally as shown in Figure 1;

Figure 2b is a cross-section along line AA of Figure 2a, and

Figure 2c is a side view of the loudspeaker of Figure 2a.

The drawings show a panel-form loudspeaker (10) comprising a resonant panel (12) having a front face (14) and rear face (16) and two vibration exciters (18,20) mounted on the panel (12) to excite bending-wave vibration in the panel (12) generally as described in WO 97/09842.

The loudspeaker (10) further comprises a shallow rear box-like enclosure (24) which defines a cavity (26) enclosing the rear face (16) of the panel (12). The enclosure (24) is acoustically opaque to prevent or reduce acoustic radiation from the rear face (16) of the panel (12). The panel (12) is mounted to the rear enclosure by means of a resilient suspension (30)

extending around the perimeter of the panel (12).

A light-emitter (22) in the form of a fluorescent tube is mounted in a support (32) in the enclosure (24) and at the lower edge thereof, as seen in Figure 1. The enclosure (24) is transparent to light and moulded from a plastics material. The support (32) for the light-emitter (22) comprises a reflector (48) which directs the emitted light as desired. In this embodiment, the loudspeaker (10) is intended for wall-mounting and thus the light is directed outwardly through the top and sides of the transparent rear enclosure (24) so that the loudspeaker also forms a wall light.

A decorative front cover (28) is mounted to the enclosure (24) to cover the front face (14) of the panel (12) and the support (32). The front cover (28) is acoustically transparent and opaque to light. Accordingly, acoustic radiation from the panel (12), but not light from the fluorescent tube, is allowed to pass through the cover (28). A lower portion (38) of the front cover is curved to match the profile of the support (32).

The front cover (28) extends beyond the edges (42) of the rear enclosure (24) so that when the loudspeaker is wall mounted, the front cover (28) conceals from the enclosure from view.

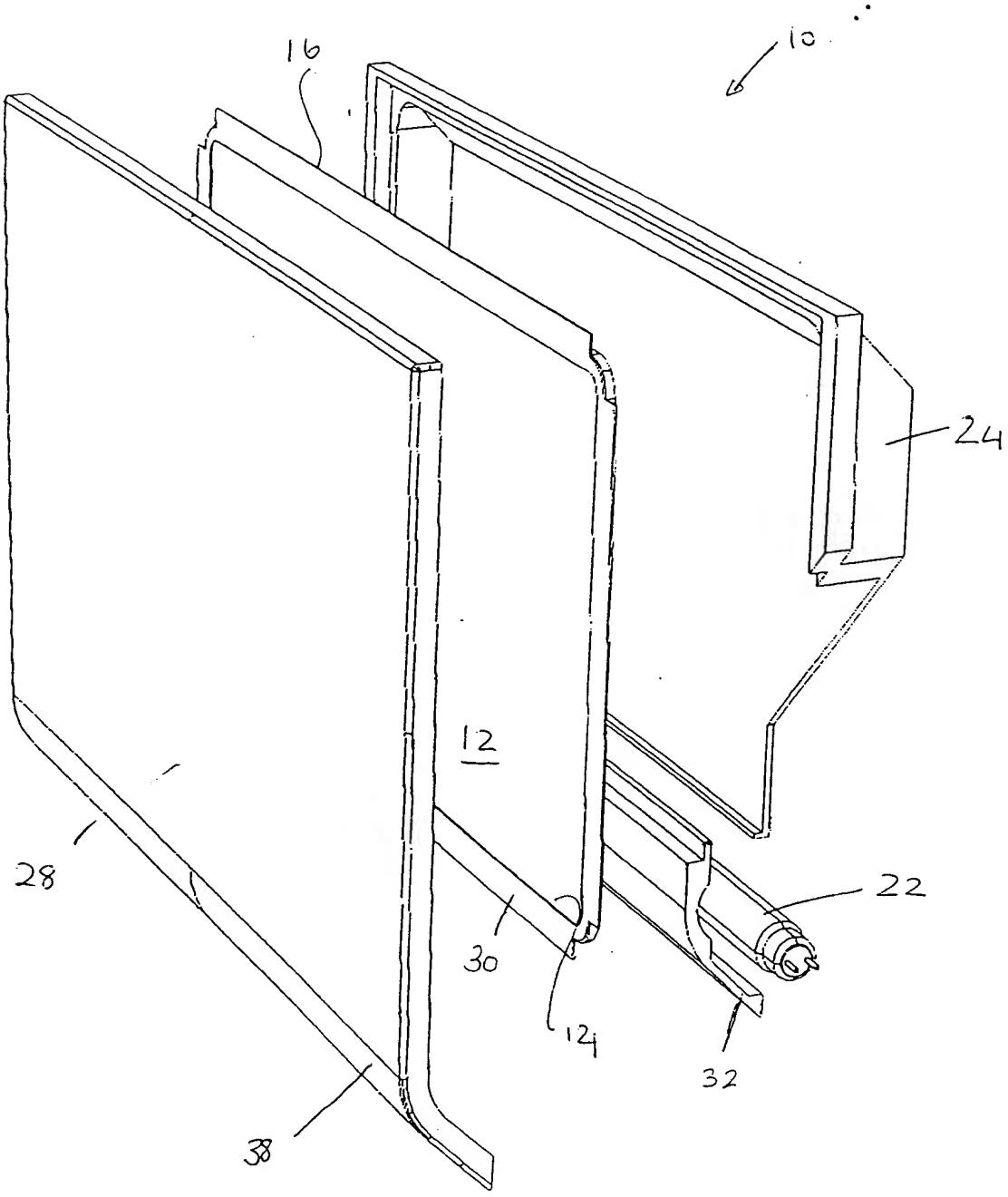
Figure 2a is a rear view of the loudspeaker with the outline of internal components, e.g. the perimeter (40) of the panel (12) and the edges (44) of the fluorescent tube shown with dotted line. The exciters (18, 20) are

mounted off-centre of the panel (12) as taught in WO 97/09842.

Figure 2b shows that the exciters (18,20) are mounted on the rear face (16) of the panel (12) and that additional support for the exciters (18,20) may be provided by resiliently suspending them on the rear enclosure (24). Accordingly, the rear enclosure comprises two inward projections or bosses (46) which are aligned with the exciters (18,20), so that the resilient suspension, not shown, can be disposed between the projections (46) and the exciters.

The invention thus provides a slim panel-form loudspeaker of increased utility, and which can be used to provide wall or ceiling lighting.

Fig 1.



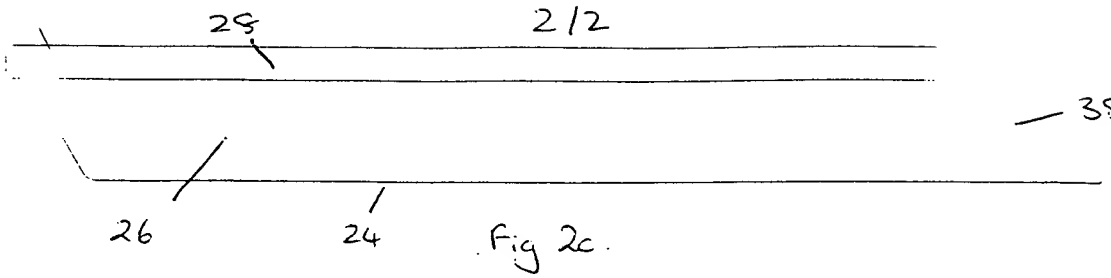


Fig 2c.

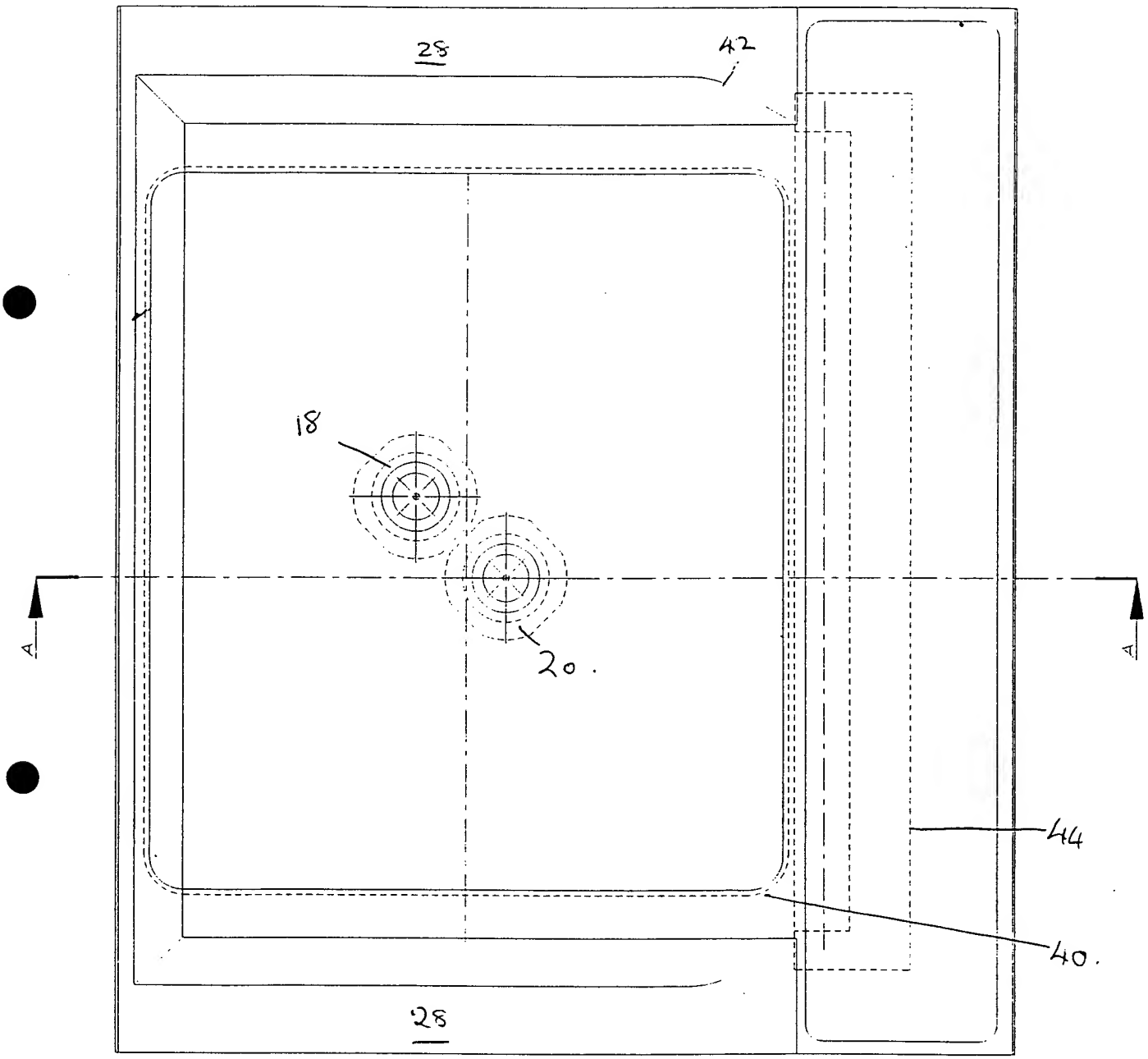


Fig 2a.

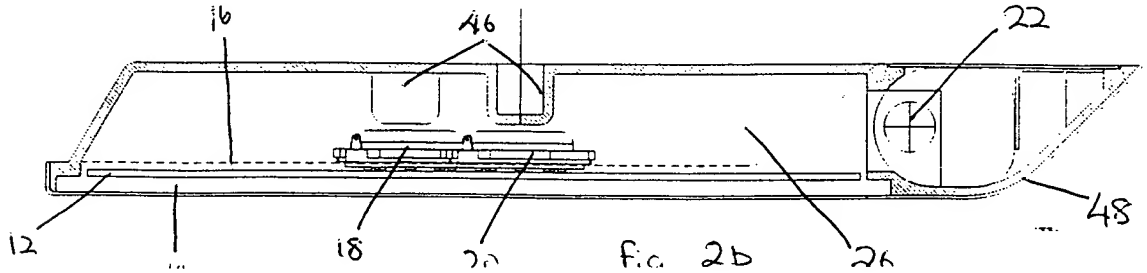


Fig 2b